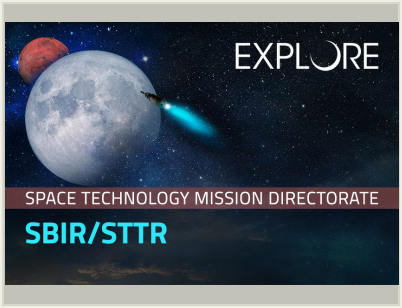
HPC Benchmark Suite NMx, Phase II

Completed Technology Project (2010 - 2012)

Project Introduction

In the phase II effort, Intelligent Automation Inc., (IAI) and University of Central Florida (UCF) propose to develop a comprehensive numerical test suite for benchmarking current and future high performance computing activities that will include: (1) dense and unsymmetrical matrix problems faced in space aviation and problems in thermally driven structural response and radiation exchange, (2) implicit solution algorithms with production models and benchmarks for indefinite matrices and pathological cases, (3) configurations scaling for large systems in shared, distributed and mixed memory conditions, (4) documentation for strengths, weaknesses, and limitations of the toolkits used together with recommendations and (5) precision and round-off studies on serial and parallel machines, comparison of solutions on serial and parallel hardware with study of wall clock performance with respect to the number of processors We successfully demonstrated in phase I that we can accurately and precisely benchmark run time solvers of dense complex matrices in hybrid-distributed memory architecture. We achieved highly scalable super-linear speed-up and scalability of the algorithm for large problem sizes. The tools developed in phase II will greatly improve the performance and efficiency to adapt the benchmarks to HPC systems different hardware architectures at NASA facilities and for non-NASA commercial applications.

Primary U.S. Work Locations and Key Partners



HPC Benchmark Suite NMx, Phase II

Table of Contents

HPC Benchmark Suite NMx, Phase II

Completed Technology Project (2010 - 2012)

Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
University of Central Florida(UCF)	Supporting Organization	Academia	Orlando, Florida

Primary U.S. Work Locations	
California	Florida
Maryland	

Project Transitions

August 2010: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139088)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Automation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

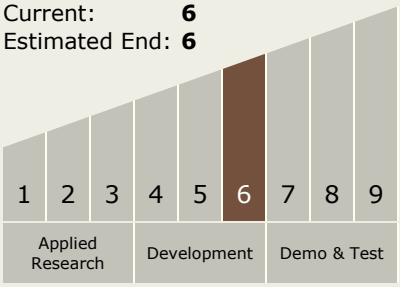
Carlos Torrez

Principal Investigator:

Sendil Rangaswamy

Technology Maturity (TRL)

Start: **6**
Current: **6**
Estimated End: **6**



HPC Benchmark Suite NMx, Phase II

Completed Technology Project (2010 - 2012)

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.1 Avionics Component Technologies
    - TX02.1.4 High Performance Memories

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System